N SG-56-60

NEW MEASUREMENTS OF STEEP LUNAR SLOPES

by

Howard A. Pohn

Division of Geological Sciences
California Institute of Technology
Pasadena, California

January 7, 1963

NEW MEASUREMENTS OF STEEP LUNAR SLOPES

by

Howard A. Pohn

Recent UBV investigations of the moon from phase angles of -25° to $+25^\circ$, using the Mount Wilson 60" telescope (Wildey and Pohn, in preparation) have yielded a rather interesting byproduct. A group of 19 craters was selected so as to give a maximum distribution in latitude and longitude. While most are bright ray craters, there are several "aged" ray craters (Shoemaker, Eugene M. and Robert J. Hackman, Stratigraphic basis for a lunar time scale, U. S. Geological Survey publication) and one non-ray crater. These objects range in size from approximately 5 km to more than 90 km. Over several runs the presence or absence of shadows cast by the interior walls of these craters was noted and the sun's altitude over the object later computed. The sun's altitude is given in the table which follows and although it yields directly a minimum value of the steepness of slopes casting a shadow at the time of the observation, it by no means gives the maximum slope of the crater wall. (For further explanation see Pohn, et al, Proceedings of the Astronomical Society of the Pacific, April issue 1962) Although a measurement of the lower limit of the maximum slope can be obtained for all of the craters, the objects near the east and west limb were not observed during periods at local high sun and it is probable that their maximum slopes are a good deal steeper than reported here. While some craters were seen to be shadowed over several observing runs, only the highest suns altitude is presented in the following table. Most of the features have slopes steeper than the values heretofore generally

believed to be present on the moon, the average value for our observation being $37.^{\circ}15$ and includes all of the craters without regard to their selenographic longitudes.

This work has been supported in full by the National Aeronautics and Space Administration under grant NsG 56-60.

TABLE 1

Object and Wall in Shadow		λ	β	Date 1962	U.T.	Sun's Altitude
Byrgius	W	−64°00'	−24°30'	Aug. 15	0539	20°.66
Aristarchus	W	−46°15'	+24°15'	Sept.13	0625	31°.03
Kepler	W	−38°00'	+08°00'	Sept.13	0628	41°.75
Bulliadus	W	−21°33'	−21°00'	Dec. 10	0514	46°.26
Copernicus	W	−20°11'	+10°11'	Dec. 10	0517	51°.87
Eratosthenes	W	−11°31'	+14°00'	Dec. 9	0829	47°.42
Birt	W	−08°31'	−22°18'	Dec. 9	0830	46°.23
Tycho	E	−10°21'	−42°07'	July 19	0809	45°.72
Tycho	W	−10°21'	−42°07'	Dec. 9	0833	33°.86
Aristillus	W	+01°46'	+33°54'	Dec. 9	0843	48°.20
Demonax	E	−10°00'	+74°00'	Sept.15	0604	39°.74
Demonax	W	−10°00'	+74°00'	Aug. 15	0625	37°.83
Plato	E	−09°49'	+51°14'	July 19	0747	14°.94
Plato	W	−09°49'	+51°14'	Dec. 9	0846	13°.36
Aristoteles	E	+17°11'	+50°20'	July 19	0744	32°.21
Menelaus	E	+08°05'	+14°25'	July 19	0740	52°.55
Dionysius	E	+17°20'	+02°50'	July 19	0732	45°.97
Theophilus	E	+27°05'	−11°21'	July 18	0934	46°.34
Mädler	E	+29°46'	−11°00'	July 18	0936	43°.77
Proclus	E	+46°30'	−16°00'	Sept.15	0539	28°.55
Taruntius	E	+46°31'	+05°24'	Sept.15	0535	29°.43
Stevinus "1"	E	+51°52'	−31°54'	Sept.15	0533	19°.68